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ABSTRACT

Four studies completed from 1973 to 1976 are described which focus on the relationship of knowledge to values clarification and/or value shifts with respect to environmental problems or issues. One-hundred twelve eighth graders were interviewed before and after a 12-week period of instruction in skills of conducting environmental education research plus an autonomous environmental education research study of the student's choosing. Seventeen fifth graders and 33 eighth graders first received instruction in skills of conducting environmental education research. They were pretested before the autonomous environmental research and then posttested. The experimental group within 50 sixth graders received a guided discovery treatment related to water use and importance to man. Forty kindergarten students were instructed in three components of the environment: air, sound, and solid waste. Data were gathered by opinionaires or questionnaires verbally or in written form. Questions involving knowledge and values were asked. It was concluded that knowledge seems to influence values. (CS)

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A Compendium of Values Clarification Research In Environmental Education At Southern Illinois University-Carbondale

Kindergarten through Middle School

by

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A Compendium of Values Clarification Research in Environmental Education at Southern Illinois University-Carbondale-Kindergarten through Middle School.

Rationale:

Science educators have become largely responsible for the research and instruction in environmental education (Fryman, 1976; Troczak and Harvey, 1976). Similarly, although there is no total agreement on the substantive structure of environmental education, there appears to be considerable agreement that values clarification is an integral component of the discipline. If one views environmental education in terms of "acquisition and application of human values" (Hungerford and Litherland, 1973), one cannot overlook relationships which may exist between knowledge and values. Breer and Locke (1965) believe that there is a relationship between the knowledge gained from a task experience and the development of beliefs, values and preferences pertaining to the task itself.

A review of the literature concerning the clarification of values relating specifically to environmental education shows very few empirical studies completed in that area. This paper is a synopsis and synthesis of four studies completed at SIU-C from 1973 to 1976 which focused on the relationship of knowledge acquisition to values clarification and/or value shifts with respect to environmental problems or issues.

Methodology and Design:

Since four studies were conducted, each differed slightly in design.

A. In the study done by Hungerford (1973) 112 eighth graders were involved in a pre-post-no control design after a 12 week period of instruction in the skills of conducting research in environmental education (EE). Each student was interviewed prior and post an autonomous E.E. research study of the student's choosing. A phenomenological open-ended questionnaire was used with each student.

B. In a study by Bisaga (1975), seventeen fifth graders and 33 eighth graders were interviewed using an open-ended questionnaire in a pre-post-no control design. In this study students first received instruction in the skills of conducting E.E. research. They were then pretested, engaged in autonomous E.E. research and finally posttested.

C. In a study by Aird (1974-75), fifty sixth grade students were used in a pre-post, control-experimental research design. The experimental group received a guided discovery treatment related to water, its use, misuse and importance to man. A written open-ended phenomenological instrument used with both groups to evaluate both knowledge increase and values.

D. In a study by Bryant (1976), forty kindergarten students were involved in a pre-post control group rotation design. Treatment involved instruction in three components of the environment: air, sound, and solid waste. A tape-recorded interview method of data collection was used with the children.

Data and Its Sources:

All data were gathered by use of phenomenological instruments including opinionnaires and/or questionnaires in either a verbal or written manner. Questions regarding the knowledge gained, the importance of the environmental issue to man and what actions the students verbalized they would take, were asked. It was assumed that a phenomenological pursuit of the data would result in relatively accurate communication of students' knowledge and values. In all instances, the researchers acquiesced that values were measured in only a verbal manner. Actual student action was not pursued. Data were further broken down into numerical form by ascertaining how many discrete value positions were communicated on both pre and posttests. Analysis was made on the basis of the numerical breakdown. Inter-scorer reliability was established in the Bisaga (1975) and Arid (1975) studies.

Results and Conclusions:

Each study is discussed separately in this context.

A. Hungerford (1973) - The researcher hypothesized that students' values concerning environmental problems are, in part, a function of knowledge about that particular problem. Students were interviewed twice; immediately prior and post independent study to acquire knowledge concerning the environmental problem they had chosen.

Theoretically, the students' communicated value position is related more closely to the value position he would actually demonstrate behaviorally regarding the problem. Therefore, shifts in the communicated value positions should be valid indication of whether new knowledge had, in fact, impinged on the students' values.

Data were analyzed into numerical form by ascertaining how many discrete value positions were communicated on both pre and posttest. Also, posttest responses that differed from pretest responses were also numerically noted so value positional shifts could be inferred. Although directionality has not applied to the shifts in values, discrete responses indicated that the subjects verbally stated more ecologically compatible responses as well as actions that could and should be taken on the posttest than on the pretest. There was a range of 25% - 35% increase in the number of discrete responses pre to post. Data tend to support the hypothesis that knowledge does influence values. They also denote increased awareness of the problems as well as clarification and refinement of students' values.

Students who were evaluated as having completed superior research studies also had the highest means in every category except pretest responses. This led to the inference that a relationship exists between cognitive research ability and both numbers of discrete responses on an affective posttest as well as shifts

in value positions. This inference has bearing on the knowledge hypothesis in that the quality of knowledge generated by students affects the number of discrete value statements given as well as the number of shifts observed in value positions as a function of students' knowledge.

B. Bisaga (1975) - the researcher replicated the Hungerford research design using fifth graders as well as eighth graders. He hypothesized that autonomous research, conducted by fifth and eighth grade students on topics of their own choosing, will affect the values they held regarding those problems.

The fifth and eighth grade samples were collapsed on the basis of pretest response number similarity. Chi square analysis of the number of discrete pre and posttest responses were made. Interscorer reliability for three scores (N=16 questionnaires) was estimated using a percentage basis (83%, 90% and 95%).

The number of discrete responses pre to post was not significantly different on any of three questions asked of students. However, a significant number of value statements as recorded on the posttest were, indeed, different from those recorded on the pretest. This difference was expressed by changes in the students' value positions and/or new value statements regarding the particular environmental problems researched. Chi square analysis of these data show that significant number of students had made these value shifts. Data permit the inference to be made that the student's autonomous research (knowledge generation) resulted in substantive shifts in the students' values. The research hypothesis was accepted.

Bisaga recommended that future research designs should include a control group to strengthen internal research validity; an increase in subject size and instructor types; further investigations of numerous instructional designs for environmental education and their impact on human values clarification and a determination of the directionality of value shifts as positive or negative from an ecological point of view.

C. Aird (1975) - In response to two of Bisaga's recommendations, Aird devised a new instructional strategy and utilized an experimental control group design. A new instrument (see Appendix) was designed to collect data on a sixth grade population. Instrument instructions were verbally administered.

Aird's independent treatment variable was a two week composite expository-guided discovery teaching technique concerned with water, its use and misuse as well as its importance to man. Data generated by responses to instrument items 1 and 2 (problems - appropriate actions) and the number of responses on the posttest that were different from responses on the pretest served as the means by which statistical analysis were made.

The instrument was validated (content validity) by a jury technique. Interscorer reliability was established upon determination of Pearson product-moment correlation values ranging from .707 to .999. Test-retest reliability was established on the control group using the dependent 't' test.

Data were analyzed using the multiple linear regression method. A significant difference in performance of the experimental group over the control group in terms of their knowledge of threats to water supplies was found. 60.77% of the variance was attributed to instruction in water management.

A comparison was made between the number of differing responses on the posttest as opposed to the pretest responses of both the experimental and control groups on Items 1 and 2. The significance of the F values (85.96,df 1, 49-Item 1 and 50.59, df 1,49-Item 2) is further substantiated by variances of 64.17% and 51.32% respectively which were attributable to knowledge of group membership, i.e. students receiving instruction in water and its conservation. Such results tend to support the premise that the quality of the posttest responses of the experimental group surpassed that of the control sample in regards to shifts in values toward water conservation.

Aird concluded that students' values in water conservation can be changed via instruction. The instructional unit on water conservation served as a highly effective vehicle causing value shifts in the experimental group responses. In essence, the data obtained corroborate the growing concept that the amount of knowledge an individual has does have an effect on the value he places on the cognified knowledge.

D. Bryant (1976) - The researcher attempted to establish the veracity of an environmental education instructional model for use with kindergarten children. The effectiveness of the model was measured in terms of whether children can acquire concepts related to the environment and environmental issues within the community and also in terms of whether clarification of values took place.

Bryant formulated two hypotheses: Subsequent to an instructional unit about the environment and selected environmental problems, kindergarten children in an experimental group will identify a significantly greater number of new things learned about the environment than will kindergarten children that have had a control group treatment and ... will identify a greater number of environmental problems. Two research questions were also posed: Will kindergarten children be able to verbally communicate personal responsibilities (value positions) related to a specific environmental problem of their choice? and will they be able to verbally communicate the responsibilities of other people (value positions) relative to that specific problem?

The instructional model was of 3 weeks duration and included an introductory model to familiarize the children with vocabulary relative to the environment. The unit also included an activity oriented approach to instruction concerning three components of the environment-air, sound, and solid waste.

The instrument (see Appendix) was administered individually and responses were tape recorded. Content validity of the instrument was established using a jury agreement technique. Responses to item #1 (which were credited with single point values for each which was correct) were used to establish equal variability between control and experimental groups on the dependent variable. Test-retest reliability was ascertained using data from Items two, three and four from the control group. Appropriate t-tests were used to analyze data in all comparison situations.

Both hypotheses were accepted. Significant "t" values on Items two, three and four for all comparisons (pre-post, experimental-control) enabled Bryant to infer that the subjects acquired concepts and values as a function of instruction. The kindergarten children not only acquired value positions, but also an awareness of problems and personal responsibilities relative to the environment. Finally, they acquired value positions from which they could both identify and establish responsibilities for environmental problems for themselves and others.

Significance:

Data from the four studies indicated the importance of knowledge of environmental education issues on the value constructs of elementary and middle school students. It would seem that human values can be influenced via learning. These four studies uncover empirical evidence substantiating the importance of the learning process and instructional treatment and their influence on value constructs. The results of the kindergarten research are especially notable in that young children are able to define both their roles and adult roles in terms of environmental action and cognitively dichotomize these roles. This would seem somewhat discrepant to prevailing theory of cognitive development in terms of abstract thought. It should surely stimulate further research into this phenomenon. The four authors recommend that further research be initiated to investigate the implementation of active, over behavioral patterns in individuals at all age levels, who verbally espouse values concomittant with action modes, as well as the application of directionality criteria to assess the quality of value shifts in terms of ecological compatibility.

Appendix: Attached to this paper are samples of the phenomenological instruments used in each of the four studies. They have been condensed to save space in terms of recording student responses.

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Research Instrument-

Values - Environmental Education
(Hungerford-8th grade) Written Format

Your Name _____

Date _____ Year in School _____

Science Class or Period _____ Instructor _____

Topic or Problem Statement (Instructor Approved) ;

Techniques I plan to use in studying this problem:
Check one or more: Secondary Sources _____ Questionnaire_____

Opinionnaire_____ Survey _____ Other_____

If "other" explain:

IMPORTANT!! Please follow these instructions carefully! At this this point we are asking you to answer the following questions:

1. Why did you choose this problem or topic? Please DO NOT use phrases like, "I am interested in this problem" . You are interested for a reason. What is this reason?

2. Of what importance is this problem or topic to people who live in your community or region?

3. You are a citizen. What do you feel you should DO as a citizen regarding this problem or topic?

Research Instrument-

Values - Environmental Education
(Bisaga - 5th and 8th graders)

Instrument to be used in an interview situation only.

	Pre	Post
	_____	_____

Date: _____ Name: _____

School: _____ Section: _____ Grade _____

Instructor: _____ Evaluator: _____

Instructor approved research topic:

What techniques do you plan to use in studying this problem? (Check one or more). Secondary source _____; Questionnaire _____; Opinionnaire _____; Survey _____; Other _____

If "other" explain:

Important! Please answer each of the following questions to the best of your ability!

1. Of what importance do you believe the problem or topic you have chosen is to the people who live in your community, region, and/or the world?

2. You are a citizen. What do YOU **feel** YOU should DO as a citizen regarding this particular problem?

3. Do you actually believe YOU WILL DO SOMETHING about this problem? If so, what do you intend to do?

Research Instrument -

Aird Research (6th grade)

This questionnaire is designed to be completely read aloud by the instructor as the student follows along reading silently to himself. After the instructor has completely read aloud the questionnaire, the students are to be directed to answer all questions.

1975
Pretest_____
Posttest_____

Questionnaire on Water Conservation

The purpose of this questionnaire is to collect information from you concerning water conservation. Please fill out the following and wait for the directions below to be read to you by your instructor:

Name: _____ Date _____

School: _____ Grade: _____

Boy: _____ Girl: _____

Directions to the Questionnaire

You are to answer the questions on the following pages to the best of your ability.

1. A supply of clean and unpolluted water is of great importance to man and many other living organisms on the planet Earth. A number of serious problems threaten available water supplies. List below as many serious problems as you can, that do threaten the available water supplies. An example might be, "oil spills at sea."

Please go to the next page.

2. It is generally agreed that water conservation is the responsibility of every citizen. What do you feel you should do to participate in the conserving of water. List these things below:

3. Of all the things you listed in question 2 above, which ones do you really feel you will do ? (Underline those things with the red pencil provided by your instructor.)

End of questionnaire. Thank you!

Appendix

Research Instrument -

Concept Development and Value Clarification in Kindergarten

1. What new things have you learned in our study of the environment?

2. With which parts of the environment do we have problems?

3. What do you think you should do about these problems?

4. What do you think other people (like adults) should do?